

Glenn Research Center Environmental Programs Manual

Chapter 6 – Pollution Prevention and Sustainability Plan

NOTE: The current version of this Chapter is maintained and approved by the Environmental Management Office (EMO). This last revision date of this chapter is July 2004. If you are referencing paper copies, please verify that it is the most current version before use. The current version is maintained on the Glenn Research Center intranet at <http://osat-ext.grc.nasa.gov/emo/pub/epm/epm-contents.pdf>. Approved by: EMO Chief, Michael Blotzer {mailto:Michael.J.Blotzer@nasa.gov}.

PURPOSE

This chapter represents the NASA Glenn Research Center (GRC) Pollution Prevention (P2) and Sustainability Plan for the year 2004. The P2 plan conforms to the requirements of GRC Environmental Management System (EMS) specified in NPG 8553.1, NASA Environmental Management System Procedures Manual and ISO 14001 as shown in [Chapter 1](#) of this manual. This chapter also satisfies the waste minimization requirements of Resource Conservation Recovery Act (RCRA) for the GRC.

This plan establishes policies and procedures for applying pollution prevention principles to facility operation and practicing Sustainability strategies with regards to purchasing decisions and GRC policies. The GRC priorities, consistent with Sustainability strategies, are affirmative procurement, source reduction, recycling, treatment, and disposal as necessary. This plan does the following:

- Establishes P2 and Sustainability goals and requirements, including hazardous waste minimization goals, for GRC during the year 2002
- Promotes waste minimization, P2 and Sustainability activities throughout the facility by all employees and contractors
- Delineates the roles and responsibilities of individuals, teams and organizations necessary to implement this plan
- Specifies GRC's baseline waste generation, material usage and environmental impact data needed to identify activities with the greatest opportunities for waste reduction and reference for P2/ Sustainability progress.
- Describes waste minimization, P2 and Sustainability activities and opportunities for the year 2004
- Establishes program metrics and evaluation procedures which relate the results of activities to the goals
- Supports EMS goals including resource allocation for cost effectiveness

APPLICABILITY

This chapter applies to all personnel at the GRC including civil servants, contractor employees, and visitors at the GRC.

DEFINITIONS

Pollution Prevention (P2)

Any practice that reduces the amount of hazardous substance, pollutant, or contaminant entering the waste stream or otherwise released to the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and reduces the hazards to public health and the environment associated with the release of such substances.

Sustainability

The policy defined by several Executive Orders (EO) (13148, 13149, 13150, etc.) that requires federal facilities to go beyond the traditional P2 efforts. This strategy promotes energy and materials conservation and programs to minimize environmental impacts of federal facilities as well as traditional P2 activities. The Sustainability EO's also require annual reports, which overlap substantially with the scope of P2 reports.

Pollution Prevention Opportunity Assessment (PPOA)

A systematic evaluation of processes and operations to:

- Characterize all aspects of the process or operation, including process flow, waste generation patterns, material and power consumption, costs, manpower, toxic chemicals;

- Define the impacts that the process and related wastes have on the air, water, and land;
- Associate impacts and wastes with specific unit operations; and
- Assign related costs and liabilities with specific wastes and management practices.
- Identify environment-friendly alternatives.

Release

Any planned or unplanned loss of toxic chemicals to the environment including air emissions, off-site transfers of chemicals, waste water discharges, underground injections of waste, and wastes disposed of in on-site landfills.

Examples include shipments of hazardous wastes to treatment, storage, and disposal (TSD) facilities.

TRI Chemical

A toxic release inventory chemical or chemical category listed in 40 CFR 372.65 as amended. Users of any of these chemicals are subject to toxic release inventory reporting requirements

NASA Environmental Tracking System (NETS)

The NASA-wide NETS is utilized to track an extensive range of environmental data from all NASA facilities, including numerous P2 and Sustainability metrics.

Acronyms

GRC	Glenn Research Center
EMS	Environmental Management System
EO	Executive Order
LTID	Logistics and Technical Information Division
NETS	NASA Environmental Tracking System
NPG	NASA Procedures and Guidelines
P2	Pollution Prevention
P2CL	Pollution Prevention Committee Leader
PPOA	Pollution Prevention Opportunity Assessment
RCRA	Resource Conservation and Recovery Act
TRI	Toxic Release Inventory
TSD	Treatment, Storage, and Disposal

BACKGROUND

This P2 and Sustainability Plan has been designed to be consistent with the goals and requirements of laws and regulations (federal, state and local), of Executive Order's (EO) of NASA mission and policies, and of the GRC goals and policies.

A very important element in the P2 program is the Pollution Prevention Opportunity Assessment (PPOA). A PPOA is a project-specific systematic evaluation of a process or operation to characterize all aspects of the process or operation, define the environmental impacts of the process, associate impacts and wastes with specific unit operations, and assign related costs and liabilities to specific wastes and management practices. Alternative products, processes and operations that reduce environmental impacts, plus health and safety hazards are identified. Vendor information is included to facilitate rapid implementation of the PPOA. Considerations used to rank PPOA's for possible implementation include environmental compliance, facility mission impact, environmental benefits, ease of implementation, and cost savings. Due to paper reduction opportunities and efficient use of personnel, PPOA's are bypassed when benefits of environmentally preferable alternative are obvious and readily available to implement.

POLICY

GRC is committed to environmental protection consistent with environmental laws and regulations, Presidential EO's, the Federal Policy on "Sustainability", NASA's *Environmental Excellence for the Twenty-First Century*, other NASA policies and the GRC environmental policies and programs.

GRC has adopted an Environmental Policy as part of the recently adopted EMS, which states:

“GRC operates in a manner that preserves and protects the environment through pollution prevention, the continual improvement of our operations, and complying with regulations”. The GRC Environmental Programs Manual further delineates this policy and all related implementation strategies. Successful implementation of this pollution prevention plan is a high priority goal for GRC.

The GRC Environmental Award Program encourages all GRC employees to contribute to the pollution prevention and environmental protection effort. Individuals and teams are encouraged to submit ideas and actively participate in the implementation of selected pollution prevention and resource conservation projects. All entrants will receive recognition while more substantial awards will be given to individuals or teams that submit and/or implement winning ideas that contribute to the pollution prevention effort and/or best reduce GRC’s impacts on the environment. A Suggestions and Ideas Status Log will be maintained as a record tracking the current status of each potential project or activity.

NASA Procedural and Requirements (NPR) documents that pertain to this P2 and Sustainability plan include NPR 8820.3 (Facility Sustainable Design) and NPR 8830.1 (Affirmative Procurement Plan for Environmentally Preferable Products). This plan will be revised annually or more often to address new requirements promulgated by regulatory agencies or established by NASA Headquarters and GRC.

The initial baseline for the evaluation of pollution prevention activities was established to be 1994, thus the status analysis relates to that baseline. However, the reference baseline may shift for certain goals as specified by law, regulation, EO and/or policy. EO 13148 establishes new goals that seem to imply the use of year 2000 data as the baseline. The appropriate baseline reference data will be used to analyze progress towards each goal and/or waste type target. These accepted baselines will be fully delineated in the P2/Sustainability Metrics System document.

NASA GRC policy dictates that annual environmental objectives and targets will be established by the Safety, Health, and Environmental Board (SHEB) as part of the EMS operation. The EMS P2 projected outcomes for GRC during the year 2004 include:

- Identify at least 12 pollution prevention activities
- Implement at least 6 pollution prevention activities

Annual Pollution Prevention and Sustainability Opportunities at GRC will be defined and maintained as a record. This list includes at least 12 possible activities that might contribute towards the EMS annual P2 targets

In addition to establishing and maintaining a current status log of projects, a P2/Sustainability Metrics System record will be maintained to specify metrics and measurement techniques for P2 and Sustainability activities. An appropriate set of metrics will be applied to each activity, and will be noted in each PPOA. Some activities will require official approval of a document to indicate completion, while other activities will be measured based upon the number of units reduced, recycled and/or removed from the disposal stream. These project-specific metrics may be expanded or modified by the P2 Committee to best address each project, and further adjustments may be made during implementation by the project P2 Implementation Committee.

The P2 Team will review P2 activities, as well as any additional ideas solicited from all NASA personnel.

REQUIREMENTS

The Pollution Prevention Act of 1990 established pollution prevention strategies as the national environmental policy in the US. Other federal environmental statutes also contain pollution prevention requirements, including the Clean Water Act, the Clean Air Act, The Resource Conservation and Recovery Act, and the Emergency Planning and Community Right-to-Know Act. The Ohio House Bill 592 established some pollution prevention rules in Ohio regarding the management of solid wastes.

Several of the Presidential EO’s place additional P2 and Sustainability requirements upon NASA GRC and other Federal facilities.

Some of these EO’s supersede previous orders. These include:

- EO 12843 which creates procurement limitations on ozone-depleting chemicals
- EO 12844 which promotes the procurement of alternative-fueled vehicles
- EO 12845 which requires the purchase of energy efficient computer equipment

- EO 12856 which requires the preparation of a written pollution prevention plan and the development of goals to reduce their use and releases of toxic chemicals
- EO 12898 which directs agencies to integrate environmental justice (EJ) into their missions
- EO 12902 which promotes water conservation and energy efficiency
- EO 13101 which requires waste prevention and recycling activities be incorporated into facility operations, and encourages the expansion of markets for recovered materials by establishing a preference for recycled products by federal facilities
- EO 13123 which establishes goals for energy efficiency and greenhouse gas reduction, directs energy consumption reduction measures, promotes renewable energy projects, and requires reductions in the use of petroleum products and water consumption
- EO 13148 which establishes P2 policies and environmental compliance audit programs, promotes management practices, and sets reduction targets and goals for persistent, bioaccumulative and toxic (PBT) chemicals, Toxic Release Inventory (TRI) releases and ozone-depleting substances
- EO 13149 sets goals for the reduction of petroleum consumption by motor vehicle fleets
- EO 13150 establishes a mass transportation and vanpool transportation fringe benefit program for qualified federal employees

Guidance documents have been provided in responses to the above requirements. These NASA guidance documents provide a more detailed description of the requirements for GRC:

- NASA Procedures and Guidelines NPG 8820.3, "Pollution Prevention", March 1, 1999 to March 1, 2004
- NASA Procedures and Guidelines NPG 8830.1, "Affirmative Procurement Plan for Environmentally Preferable Products", February 1, 1999 to February 1, 2004

This plan shows how GRC builds a comprehensive program to prevent pollution, reduce waste, conserve energy, and preserve natural resources to satisfy RCRA hazardous waste minimization requirements, as well as the P2/Sustainability requirements.

Source Reduction

GRC will eliminate or reduce pollution at source through process changes, reengineering material substitution, and education. Specific source reduction elements will be the following:

- Quantity of each chemical entering the waste stream, being recycled, treated, or disposed
- Source reduction best management practices used for each chemical
- Techniques used to identify source reduction opportunities.

Reuse

The second choice in the hierarchy of preferred waste management practices has been a goal of excess activities and other Logistics and Technical Information Division programs.

Recycling

GRC has established goals for solid waste prevention and recycling for the year 2001. Recycling is the second choice in the hierarchy of preferable environmental waste management practices. The components of GRC's waste streams that can be recycled include, but are not limited to paper, cardboard boxes, aluminum cans, scrap metals, tires, used oil and batteries. GRC used these guidelines to set its recycling program:

- Training the GRC personnel to participate in the recycling program
- Obtaining appropriate approval and support for the recycling program
- Marketing recyclables and monitoring costs and revenues associated with the recycling program.

Treatment and Disposal

Treatment and disposal are the next two choices in the hierarchy of preferable environmental waste management. Treatment is for pollution that cannot be prevented or recycled in an environmentally-safe manner. Disposal of hazardous waste is the last resort and used. It is to be done legally and in an environmentally safe manner at a permitted TSD facility.

Affirmative Procurement

GRC has established an affirmative procurement program for purchase of environmentally preferable materials as identified by the EPA in 40CFR 247, *Comprehensive Procurement Guideline for Products Containing Recovered Materials*. GRC uses NPG 8830, *NASA Procedures and guidelines for Affirmative procurement of Environmentally Preferable Goods and Services*.

PROCEDURES

Pollution prevention and Sustainability are the responsibilities of all GRC employees. Knowledgeable and competent individuals have been assigned roles and responsibilities to guide and implement this plan, working with and encouraging participation from all GRC employees and organizations.

The roles and responsibilities of key individuals and teams are described below:

Safety, Health, and Environmental Board (SHEB)

- Formally approves and assigns members of the P2 Overview Committee, the PPOA Sub-committee and the P2 Implementation Sub-committee
- Conducts an annual management review of the P2 and Sustainability program and activities
- Establishes annual EMS targets

Chief, Environmental Management Office (EMO)

- Oversee the P2 and Sustainability activities, with particular regards towards consistency with the EMS and other NASA policies and requirements
- Appoints the Pollution Prevention Committee Leader
- Appoints experts as necessary to a specific activity
- Help to obtain funding for selected projects when feasible

Pollution Prevention Committee Leader (P2CL)

- Pursues new P2 and Sustainability opportunities continually
- Takes the lead on all P2 activities
- Responsible for all P2 reporting and documentation
- Chairs the Pollution Prevention Team meetings
- Develops and updates P2 metrics and Pollution Prevention Opportunity Assessment (PPOA) evaluation criteria
- Forms collaborations and seeks funding for selected P2 activities
- Promotes P2 site-wide
- Serves as a member of all PPOA projects and P2 Implementation Sub-committees
- Analyzes all P2 activities for effectiveness
- Reports quarterly to the EMO Chief and the EPCB on progress towards meeting EMS objectives and targets
- Updates this plan annually

Pollution Prevention/Sustainability Committee (P2)

- Includes P2/Sustainability Committee Lead, appropriate representatives from Chemical Management Team, Environment Team, Logistics (recycling and purchasing), Facility Division, researchers, representatives from specific key buildings, and any other volunteer within GRC.
- Serves as an advisory group for the entire P2 program
- Reviews and recommends P2 metrics and PPOA evaluation criteria
- Collects P2 and Sustainability data as needed for records, reports and documents
- Selects activities for PPOA
- Requests experts as necessary on assignment to a PPOA
- Performs PPOA's (may be performed by a smaller project committee) and prepares the reports
- Reviews PPOA's (full committee)
- Recommends P2 Implementation Projects
- Recommends P2 Implementation Sub-committee
- Reviews P2 Activities & results
- Advises the P2 Committee Lead on the preparation of P2 reports and documents
- Reviews and approves the annual P2 report to the EMO Chief & the (SHEB)

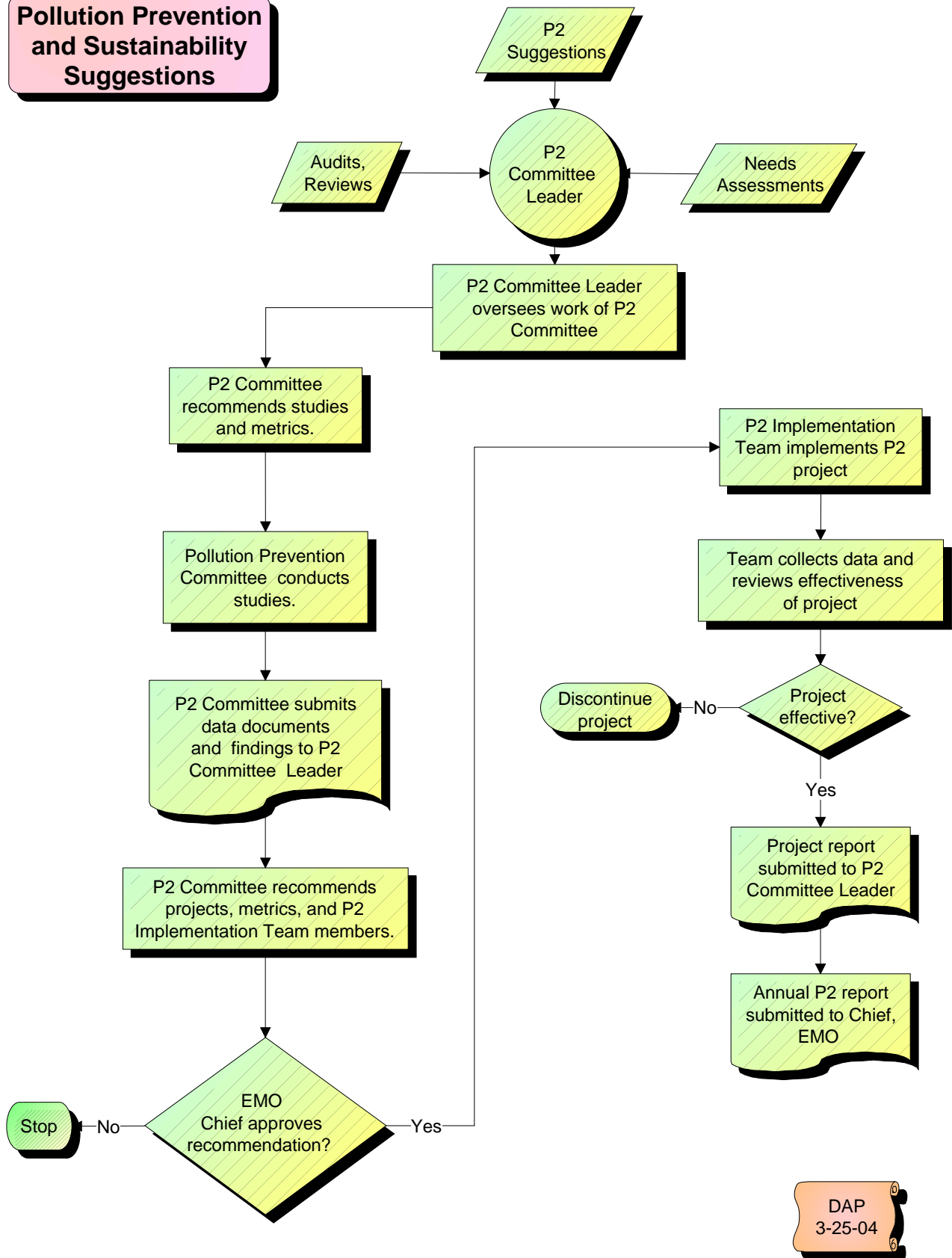
P2 Implementation Sub-committees (P2I)

- Consist of project-specific committees assembled from across GRC to implement a selected P2 activity, generally will include a substantial portion of the project PPOA Team, but will also include GRC personnel that will be most directly affected by the activity, includes the P2 Committee Leader
- Use the funding provided through the P2 Committee Leader to implement the activity
- Collect data/information to evaluate the project
- Information and comments/observations are provided to the P2 Committee Leader for analysis

Facility Personnel

- All civil servants, contractors, academic visitors and other GRC personnel will cooperate with the PPOA and P2 Implementation Sub-committees in their efforts to implement this plan
- On a volunteer basis, participate in the GRC Environmental Award Program

Pollution Prevention and Sustainability Suggestions



RECORDS

- Annual P2 Report to NASA Headquarters
- Quarterly Report of P2/Sustainability Activities
- Monthly P2 Projects Status Log
- Project Summaries
- Implementation Projects Reports

REFERENCES

- 42 U.S.C. 13101 *et seq.*, the Pollution Prevention Act of 1990
- Executive Order 12843, “Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances” (revoked by EO 13148)
- Executive Order 12844, “Federal Use of Alternative Fueled Vehicles”
- Executive Order 12845, “Requiring Agencies To Purchase Energy Efficient Computer Equipment”
- Executive Order 12856, “Federal Compliance With Right-to-Know Laws and Pollution Prevention Requirements” (revoked by EO 13148)
- Executive Order 12898, “Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations”
- Executive Order 12902, “Federal Efficiency and Water Conservation at Federal Facilities”
- Executive Order 12969, “Federal Acquisition and Community Right-to-Know” (revoked by EO 13148)
- Executive Order 13101, “Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition”
- Executive Order 13123, “Greening the Government Through Efficient Energy Management”
- Executive Order 13148, “Greening the Government Through Leadership in Environmental Management”
- Executive Order 13149, “Greening the Government Through Federal Fleet and Transportation Efficiency”
- Executive Order 13150, “Federal Workforce Transportation”
- NASA GRC, *GRC Environmental Programs Manual*
- NASA’s Environmental Strategy, *Environmental Excellence for the Twenty-First Century*
- “NASA Plan for Implementation of Executive Order 12856, Pollution Prevention and Community Right-to-Know”, October 1995
- US Environmental Protection Agency (EPA) *EPA Federal Facility Pollution Prevention Planning Guide*, EPA 300-B-94-012
- US Environmental Protection Agency (EPA) *Federal Facility Pollution Prevention: Tools for Compliance*, EPA 600-R-94-154

INFORMATION RESOURCES

- US EPA, *Costing and Life Cycle Analysis for Pollution Prevention Investments: A Practical Users Guide to Environmental Project Financial Analysis at Federal Facilities*
- US EPA, *Pollution Prevention Directory*, EPA 742-B-94-005
- Ohio EPA, Ohio Material Exchange (OMEx): a Statewide Recycling Service at <http://www.epa.state.oh.us/opp/recyc/omex.html>
- US EPA, Pollution Prevention Information Clearinghouse (PPIC) at <http://www.epa.gov/opptintr/library/ppicindex.htm>
- US EPA, Pollution Prevention Resource Exchange (P2Rx) at <http://www.epa.gov/p2/assist/index.htm#p2rx>
- US EPA, Significant New Alternatives Policy (SNAP) Program at <http://www.epa.gov/ozone/snap/>
- Massachusetts Toxic Use Reduction Institute, P2Gems at <http://www.p2gems.org>
- Ohio EPA, Office of Pollution Prevention at <http://www.p2gems.org>
- National Pollution Prevention Roundtable at <http://www.p2.org>

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Last Revised: July 2004